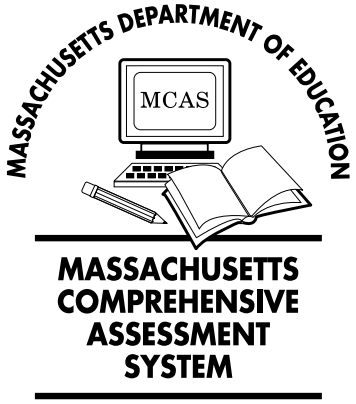

Release of November 2005 Retest Items

December 2005
Massachusetts Department of Education

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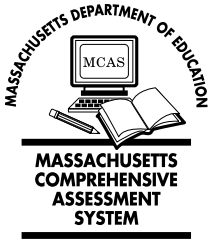

Massachusetts Department of Education

This document was prepared by the Massachusetts Department of Education.
Dr. David P. Driscoll, Commissioner of Education

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Commissioner's Foreword

Dear Colleagues:

The Massachusetts Comprehensive Assessment System (MCAS) is the Commonwealth's statewide testing program for public school students. Designed to meet the provisions of the Education Reform Law of 1993, MCAS is based exclusively on the learning standards contained in the Massachusetts *Curriculum Frameworks*. The MCAS program was developed with the active involvement of educators from across the state and with the support of the Board of Education. Together, the *Frameworks* and MCAS are continuing to help schools raise the academic achievement of all students in the Commonwealth.

One of the goals of the Department of Education is to help schools acquire the capacity to plan for and meet the accountability requirements of both state and federal law. In keeping with this goal, the Department regularly releases MCAS test items to provide information regarding the kinds of knowledge and skills that students are expected to demonstrate on the tests to earn a high school Competency Determination. Local educators are encouraged to use this document together with their school's *Test Item Analysis Reports* as a guide for planning changes in curriculum and instruction that may be needed to ensure that schools and districts make regular progress in improving student performance.

This document, which includes all the test items from the November 2005 Retests in English Language Arts and Mathematics, is also available on the Internet at **www.doe.mass.edu/mcas/testitems.html**. With the exception of the English Language Arts Composition writing prompt, the test questions on the November Retests were identical to those in the August 2005 Retests.

Thank you for your support as we work together to strengthen education for our students in Massachusetts.

Sincerely,

David P. Driscoll
Commissioner of Education

Table of Contents

I. Document Purpose and Structure

Document Purpose and Structure

Purpose

The purpose of this document is to share with educators and the public all of the test items from the November 2005 MCAS English Language Arts and Mathematics Retests. Local educators will be able to use this information to identify strengths and weaknesses in their curriculum and instruction, and to guide the changes necessary to more effectively meet their students' needs.

This document is also intended to be used by school and district personnel as a companion document to the *Test Item Analysis Reports*. Each school in which a retest was administered receives a November Retest *Test Item Analysis Report* for English Language Arts and Mathematics. These reports provide data generated from student responses. Each report lists, for the school receiving the report, the names of all enrolled students who took the November 2005 Retest in that report's content area, and shows how each student answered each test item. The report labels each item as multiple-choice, open-response, short-answer, or writing prompt and identifies the item's MCAS reporting category. Item numbers in this document correlate directly to the "Item Numbers" in the *Test Item Analysis Reports*.

Structure

Chapters II and III of this document contain, respectively, information for the November 2005 English Language Arts and Mathematics Retests. Each of these chapters has three main sections. The **first section** introduces the chapter by listing the Massachusetts *Curriculum Framework* content strands assessed by MCAS in that chapter's content area. These content strands are identical to the MCAS reporting categories under which retest results are reported to schools and districts. In addition, there is a brief overview of the retest (number of test sessions, types of items, reference materials allowed, and cross-referencing information).

The **second section** contains the test items used to generate November 2005 MCAS student results for that chapter's content area. The test questions in this document are shown in the same order in which they were presented in the test booklets. The *Mathematics Reference Sheet* used by students during MCAS Mathematics test sessions is inserted immediately following the last question in the Mathematics chapter.

The **final section** of each chapter is a table that cross-references each item with its MCAS reporting category and with the *Framework* standard it assesses. Correct answers to multiple-choice questions and, for the Mathematics Retest, short-answer questions, are also listed in the table.

Materials presented in this document are **not** formatted **exactly** as they appeared in Student Test Booklets. For example, in order to present items most efficiently in this document, the following modifications have been made:

- Some fonts and/or font sizes may have been changed and/or reduced.
- Some graphics may have been reduced in size from their appearance in Student Test Booklets; however, they maintain the same proportions in each case.
- All references to page numbers in answer booklets have been deleted from the directions that accompany test items.
- The November and August English Language Arts Composition writing prompts are presented on the same page of this document, and the four lined pages provided for students' initial drafts are omitted.

II. English Language Arts Retest

A. Composition
B. Language and Literature

English Language Arts Retest

Test Structure

The English Language Arts Retest was presented in the following two parts:

- the ELA Composition Retest, which used a writing prompt to assess learning standards from the Massachusetts *English Language Arts Curriculum Framework's* **Composition** strand

- the ELA Language and Literature Retest, which used multiple-choice and open-response questions (items) to assess learning standards from the *Curriculum Framework's* **Language** and **Reading and Literature** strands

A. Composition

The English Language Arts Composition Retest was based on learning standards in the Composition strand of the Massachusetts *English Language Arts Curriculum Framework* (2001). These learning standards appear on pages 72–83 of the *Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports*, ELA Composition Retest results are reported under the **Composition** reporting category.

Test Sessions and Content Overview

The MCAS ELA Composition Retest included two separate test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote an initial draft of a composition in response to the writing prompt on the next page. During the second session, each student revised his/her draft and submitted a final composition, which was scored in the areas of Topic Development and Standard English Conventions. The MCAS Writing Scoring Guide (Composition Grade 10) is available at www.doe.mass.edu/mcas/student/2004/scoring10.doc.

Reference Materials

At least one English-language dictionary per classroom was provided for student use during ELA Composition test sessions. The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only. No other reference materials were allowed during either ELA Composition test session.

Cross-Reference Information

Framework general standards 19–22 are assessed by the ELA Composition.

English Language Arts Retest

November Retest Writing Prompt

WRITING PROMPT

In literature, characters often demonstrate responsibility or a lack of responsibility.

From a work of literature you have read in or out of school, select a character who demonstrates responsibility or a lack of responsibility. In a well-developed composition, identify the character, show how the character demonstrates responsibility or a lack of responsibility, and explain how the character's behavior affects the work of literature.

August Retest Writing Prompt

WRITING PROMPT

Often in works of literature, a character takes an unpopular stand on an issue.

From a work of literature you have read in or out of school, select a character that takes an unpopular stand on an issue. In a well-developed composition, identify the character, describe the unpopular stand the character takes, and explain why the character's stand on the issue is important to the work of literature.

B. Language and Literature

The English Language Arts Language and Literature Retest was based on learning standards in the two content strands of the Massachusetts *English Language Arts Curriculum Framework* (2001) listed below. Page numbers for the learning standards appear in parentheses.

- Language (*Framework*, pages 19–26)
- Reading and Literature (*Framework*, pages 35–64)

The *English Language Arts Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports*, ELA Language and Literature Retest results are reported under two MCAS reporting categories: **Language** and **Reading and Literature**, which are identical to the two *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS ELA Language and Literature Retest included three separate test sessions. Sessions 1 and 2 were both administered on the same day, and Session 3 was administered on the following day. Each session included selected readings, followed by multiple-choice and open-response questions.

Reference Materials

The use of bilingual word-to-word dictionaries was allowed for current and former limited English proficient students only during all three ELA Language and Literature Retest sessions. No other reference materials were allowed during any ELA Language and Literature test session.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* general standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

English Language Arts

Language and Literature: Session 1

DIRECTIONS

This session contains two reading selections with eleven multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Author T. Edward Nickens describes the Big Night for salamanders. He often endures stormy conditions to watch these creatures. Read the article "A Stormy Love Affair With Salamanders" *to learn about the Big Night. Answer the questions that follow.*

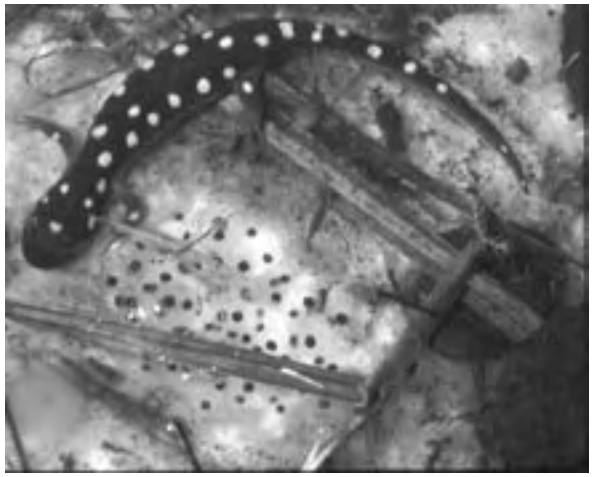
A Stormy Love Affair With Salamanders

by T. Edward Nickens

1 **BY ALMOST ANY STANDARD** it was a miserable spring night in central Massachusetts: temperatures in the low 40s, skies dumping rain on the last remnants of dingy snowdrifts. A miserable spring night for all but the salamanders, and they were on the move. Right by my nose, in fact. As I sprawled on the sopping ground on a wooded ridge just outside of Amherst, a sausage-sized salamander crept slowly over the leaves, awash in the red-filtered light from my headlamp. Perhaps eight inches long, black as onyx and drizzled with neon yellow spots, it was a male spotted salamander. Behind him was another and another. Like miniature milking cows headed to the barn, spotted salamanders worked their way downslope. Seven walked by, nose-to-tail, in the manner of circus elephants. Another, oddly enough, gave a wood frog a piggyback ride. They streamed downhill, mere inches away, oblivious to a human presence.

2 Each year during the first warm rains of early spring, I try to witness one of the natural world's least-heralded wonders: the Big Night. The Big Night is a magical confluence of the calendar and the weather that impels mole salamanders toward their breeding pools. After spending most of the year underground, these salamanders — spotteds, Jeffersons, tigers and others of the family Ambystomatidae — take advantage of wet, moderate conditions to emerge and hightail it (relatively speaking) toward woodland depressions called vernal pools. Filled with water for only part of the year, vernal pools offer them a safe place to breed — free of many fish predators that would relish every salamander egg, larva, juvenile and adult.

3 The woods outside Amherst are famous for salamander migrations, mostly because of the salamander tunnels constructed under Henry Street in 1987. They draw hundreds of salamanders — and scores of onlookers — during likely weather. Yet salamander migrations occur all over Massachusetts and the rest of the country. "People hear about Amherst and they drive all the way over here," says Scott Jackson, a University of Massachusetts wildlife biologist, "when the same thing happens in a lot of their backyards."



RITE OF SPRING: A spotted salamander rests in a pool with a mass of eggs. Each year mole salamanders such as this one emerge from underground lairs to breed in ephemeral,[1] and often imperiled,[2] wetlands.

4 I've lain in wait for migrating salamanders from the Catskills to the Great Smokies to the rolling Piedmont woods 15 minutes from my North Carolina home. When early spring skies open up with a gloriously dismal overnight rain, I don waders[3] and a wide-brimmed hat and head out to my favorite breeding pool, a comma-shaped depression at the base of a soaring ridge of beech trees. A few years ago I crunched through remnant drifts of snow along the trail to the pool, my flashlight beam slashing through fog. Wading carefully in the calf-deep water I found vicious-looking diving beetle larvae hovering like hawks and scattered giant water bugs and whirligigs. Spotted salamanders writhed in the shallows, rubbing and nudging one another in a courtship dance that can last several minutes.

5 Last year, at that same pool, I was a few days late to the Big Night dance. Scores of softball-sized jelly masses of salamander eggs clung to underwater twigs and stumps, and spring peepers and chorus frogs called with a din of peeps and trills so loud I could barely hear myself shout. A freak early thunderstorm crackled overhead as I carefully lifted mossy logs to spy on marbled salamanders hidden underneath. What a stew of primordial sights and sounds! The frog calls like shrieking ghouls, the electric flash of lightning, the gasp of breath as a brimful of rainwater dumps down the back of my slicker — I've never understood why salamander watching doesn't attract a larger following.

6 It should, for mole salamanders need a helping hand. Each year they emerge into a strange new world, unprepared for whatever changes might have altered the woods since their last trek. A depression that hosted salamanders for decades might easily disappear from one year to the next. Perhaps a road has been built. Or a seep has been ditched, plowed and planted. Or a block of bottomland forest has been logged.

7 Alone in the wet woods, I can only hope that the number of people willing to protect these fragile habitats is larger than the number willing to weather the salamander storms of early spring.

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[1] *ephemeral* — short-lived
[2] *imperiled* — endangered
[3] *waders* — waterproof hip boots or pants that extend above the waist

TEXT: T. Edward Nickens. PHOTO: A. B. Sheldon.

1 According to the article, what makes Amherst, Massachusetts, special?

A. The town is the only place in the state where salamander migrations still occur.

B. The town discourages people from watching salamander migrations.

C. The author first learned about salamander migrations there.

D. The people of the town built tunnels for the salamander migrations.

2 What is the effect of the author's use of figurative language in paragraph 1?

A. It contrasts the size of a salamander with other animals.

B. It helps readers visualize the scene of migrating salamanders.

C. It informs the reader indirectly that salamanders are difficult to observe.

D. It describes the courtship of male and female salamanders.

3 According to the article, what is the Big Night?

A. the time when female salamanders deposit their larvae

B. the time when salamanders return to their underground homes

C. the time when conditions are right for salamanders to breed

D. the time when salamanders migrate to Amherst

4 According to the article, which of the following is essential for salamanders to breed?

A. melted snow

B. thunderstorms

C. warm rain

D. pools of water

5 According to the article, why do mole salamanders need a helping hand?

A. Their breeding grounds are endangered.

B. Bad weather often disrupts their breeding season.

C. Salamander tunnels have hampered their breeding.

D. Female mole salamanders outnumber the males.

6 What is the **best** meaning of the word *impels* as it is used in paragraph 2?

A. rains upon

B. buries within

C. urges forward

D. carries away

7 What part of speech is the word *seep* in paragraph 6?

A. verb

B. noun

C. adjective

D. adverb

Write your answer to open-response question 8 in the space provided in your Student Answer Booklet.

8 Based on the article, explain how the author shows his enthusiasm for the Big Night. Use relevant and specific information from the article to support your answer.

In the Anglo-Saxon epic Beowulf*, a hero announces his intentions to defend his people from a dragon. Read the excerpt and use the information to answer the questions that follow.*

Beowulf

Translated by Seamus Heaney

Beowulf spoke, made a formal boast
for the last time: "I risked my life
often when I was young. Now I am old,
but as king of the people I shall pursue this fight
for the glory of winning, if the evil one will only
abandon his earth-fort and face me in the open."

Then he addressed each dear companion
one final time, those fighters in their helmets,
resolute[1] and high-born: "I would rather not
use a weapon if I knew another way
to grapple with the dragon, and make good my boast
as I did against Grendel[2] in days gone by.
But I shall be meeting molten venom
in the fire he breathes, so I go forth
in mail-shirt[3] and shield. I won't shift a foot
when I meet the cave-guard: what occurs on the wall
between the two of us will turn out as fate,
overseer of men, decides. I am resolved.
I scorn further words against this sky-borne foe.

"Men at arms, remain here on the barrow,[4]
safe in your armour, to see which one of us
is better in the end at bearing wounds
in a deadly fray. This fight is not yours,
nor is it up to any man except me
to measure his strength against the monster
or to prove his worth. I shall win the gold
by my courage, or else mortal combat,
doom of battle, will bear your lord away."

---

[1] *resolute* — determined
[2] *Grendel* — a man-eating dragon that Beowulf killed
[3] *mail-shirt* — a type of armor made of small overlapping metal rings, loops of chain, or scales
[4] *barrow* — a large mound made of earth or stones constructed over a burial site

9 To whom is Beowulf speaking in the excerpt?

A. his family

B. his rivals

C. his warriors

D. his cave guards

10 In line 15, what does Beowulf mean when he says he "won't shift a foot"?

A. He will be motionless from fear.

B. He will make sure he keeps his balance.

C. He will not act until other soldiers join him.

D. He will not retreat from the dragon.

11 According to the excerpt, where does Beowulf intend to fight with the dragon?

A. in a forest

B. at the dragon's cave

C. on a barrow

D. outside Beowulf's castle

12 According to Beowulf's words, what will determine the outcome of the battle?

A. experience

B. skill

C. weapons

D. fate

Write your answer to open-response question 13 in the space provided in your Student Answer Booklet.

13 Beowulf reveals himself to be an honorable man in the excerpt. Identify **two** examples from the excerpt and explain how they illustrate Beowulf's honor. Use relevant and specific information from the excerpt to support your answer.

English Language Arts

Language and Literature: Session 2

DIRECTIONS

This session contains two reading selections with twelve multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

An epilogue is a short piece at the end of a longer work. In this epilogue from the book A Step from Heaven*, Uhmma's hands tell many stories about her life; they are daily reminders of what she has done. Learn about what Uhmma's hands say by reading* Epilogue: Hands. *Answer the questions that follow.*

Epilogue: Hands

by AN NA

1 Uhmma's [*Uhmma* means "Mother" in Korean] hands are as old as sand. They have always been old, even when we were young. In the mornings, they would scratch across our sleeping faces as she smoothed our foreheads, our cheeks, and told us quietly, Wake up. Time for school.

2 At work, her hands sewed hundreds of jeans before the lunch bell sounded and then boxed hundreds more before she left for her night job at Johnny's Steak House. They knew how to make a medium-rare steak, baked potato on the side, in ten minutes flat for hungry customers always in a hurry.

3 Uhmma's hands washed our dinner dishes, cleaned the kitchen floor with a rag, folded load after load of laundry. They could raise hems of second-hand dresses with stitches so tiny there was barely a line. Even on Sunday they held a Bible and helped set out doughnuts and coffee after the service. Uhmma's hands rarely rested.

4 But sometimes, not often—and not when Uhmma was tired and wanted only to feel the cool underside of a pillow—but sometimes, her hands would open. Sitting cross-legged on the carpet, in a sunspot bright as the open sea, Uhmma unfurled her fingers. Palms up. A flower finally open to the bees.

5 Joon and I would rush to sit on either side of her. Uhmma held our small hands in her own and said she could read stories in the lines of our palms.

6 Look, Young Ju, Uhmma said. Your intelligence line is strong. Someday, maybe you will become a doctor. Uhmma traced the line with her cat-tongue finger, tickling my hand as it moved from the heel of my palm up to the base of my middle finger.

7 Joon shoved away my hand and offered his for inspection. Look at my intelligence line, Uhmma.

8 These baby hands have lines? Let me see, Uhmma said and brought his palm up close to her face. She studied it for a moment and then suddenly kissed the middle. Plop. A raindrop on water.

9 Joon giggled, kicking out his feet. This one, Uhmma. Tell me about this one, Joon said and pointed to a line on his palm, the one that predicted he would live to be an old, successful man with many children.

10 It did not matter that we had heard the stories before. Each telling was a lullaby of dreams we never wanted to wake from. We were reaching, always reaching, to touch Uhmma's sandpaper palms.

11 Uhmma said her hands were her life. But for us, she only wished to see our hands holding books. You must use this, she said and pointed to her mind. Uhmma's hands worked hard to make sure our hands would not resemble hers.

12 It takes only a glance at our nails, our knuckles, our palms to know Uhmma succeeded. Joon and I both possess Uhmma's lean fingers, but without the hard, yellowed calluses formed by years of abuse from physical labor. Our hands turn pages of books, press fingertips to keyboard buttons, hold pencils and pens. They are lithe* and tender. The hands of dreams come true.

13 As I walk with Uhmma now, her hand grasped firmly in mine, I can feel the strength that was there in our childhood ebbing away. I cup her hand, unfurl her fingers, and let the lines of her palm speak to the sky. They are the marks of story and time. For some it might be hard to tell which lines were there from birth and which ones immigrated from countless jobs. But I can tell.

14 I trace a set of tiny lines etched along her thumb. They speak of Uhmma's early years gathering and drying fish along the Korean coastline. I follow another path and find a deep groove at the base of her pointer finger. Immediately I smell the smoky kitchen of the steak house crowded with visitors just pulling off the I-5** for dinner.

15 Too busy, she had explained as she unwound the Reynolds plastic wrap and tried to peel away the blood-soaked napkin from the cut. The old scar, white and fleshy, still remembers the hard kiss of the dancing knife.

16 I smooth the tips of her fingers. Tiny flecks of skin, parched from dry-cleaning clothes, ironing shirts, "heavy on the starch," stand up searching for the moisture that was robbed day after day for eleven years.

17 In the middle of her palm, the creases are still strong. Although the line of riches is cut short by a scar from an unseen hook caught in a fish's mouth, her lifeline extends out full and long. The marriage line is faint, crisscrossed by tiny cracks in the skin starting and ending in a mystery. Uhmma's hands have lived many lives, though her hair only recently has begun to gray.

18 I study these lines of history and wish to erase them. Remove the scars, the cuts, fill in the cracks in the skin. I envelop Uhmma's hands in my own tender palms. Close them together. Like a book. A Siamese prayer. I tell her, I wish I could erase these scars for you.

19 Uhmma gently slips her hands from mine. She stares for a moment at her callused skin and then says firmly, These are my hands, Young Ju. Uhmma tucks a wisp of my long, straight black hair behind my ear and then puts her arm around my waist. We continue our walk along the beach.

---

* *lithe* — readily bent, supple

** *I-5* — major highway along the West Coast

14 What is the excerpt **mainly** about?

A. Uhmma's determination to further her career

B. Uhmma's selfless dedication to her children's future

C. why the narrator wants to change Uhmma's hands

D. why the narrator dreams about having hands like Uhmma's

15 According to the excerpt, where does Uhmma work when the children are young?

A. at a fish business and a laundry

B. at a garment factory and a restaurant

C. at a church and a housecleaning business

D. at a coffee shop and a dry cleaners

16 What is the author referring to when she writes in paragraph 8, "Plop. A raindrop on water"?

A. Uhmma's finger on Joon's hand

B. Uhmma's kiss on Joon's hand

C. Uhmma's description of Joon's hand

D. Uhmma's prediction from Joon's hand

17 According to the excerpt, how do the children feel about Uhmma reading stories in their palms?

A. They always long for Uhmma to see a new story in their palms.

B. They know the stories tell of Uhmma's life, not theirs.

C. They like to hear the stories over and over.

D. They like the stories because she tickles their palms.

18 According to the excerpt, how does the reader know the children eventually fulfilled Uhmma's dream?

A. They inherit the wealth of Uhmma's hard work.

B. They often visit their mother in Korea.

C. They tell Uhmma's stories to their children.

D. They use their minds to make their livings.

19 Based on the excerpt, which of the following **best** explains how the narrator feels about Uhmma's hands?

A. She wishes that her own hands were like Uhmma's.

B. She wishes that Uhmma's hands could teach others.

C. She wants Uhmma to have her scars seen by a doctor.

D. She wants to change the story Uhmma's hands tell.

20 What does Uhmma **probably** mean in paragraph 19 when she says, "These are my hands"?

A. She has accepted her life for what it is.

B. She can do nothing when someone is holding her hands.

C. She has strong hands to help others.

D. She can read many stories about herself in her hands.

21 What is the meaning of the word *unfurled* as it is used in paragraph 4?

A. grasped

B. pointed

C. extended

D. bandaged

Write your answer to open-response question 22 in the space provided in your Student Answer Booklet.

22 Explain how hands record the stories of the characters' lives in this excerpt. Use relevant and specific information from the excerpt to support your answer.

In his poem "To The Evening Star," *English poet William Blake admires the planet Venus, also known as the "evening star." Read the poem and answer the questions that follow.*

TO THE EVENING STAR

Thou fair-hair'd angel of the evening,
Now, whilst the sun rests on the mountains, light
Thy bright torch of love; thy radiant crown
Put on, and smile upon our evening bed!
Smile on our loves, and, while thou drawest the
Blue curtains of the sky, scatter thy silver dew
On every flower that shuts its sweet eyes
In timely sleep. Let thy west wind sleep on
The lake; speak silence with thy glimmering eyes,
And wash the dusk with silver. Soon, full soon,
Dost thou withdraw; then the wolf rages wide,
And the lion glares thro' the dun* forest:
The fleeces of our flocks are cover'd with
Thy sacred dew: protect them with thine influence.

—*William Blake*

* *dun* — a neutral brownish gray color

23 What metaphor does the speaker use for the evening star?

A. angel

B. torch of love

C. crown

D. blue curtains

24 What does the speaker describe in lines 3 and 4?

A. the evening star's brilliance

B. the summer sun's warmth

C. the late evening's coolness

D. the new moon's power

25 What does the speaker describe in lines 5 and 6?

A. the comfort of sleep

B. the view from a window

C. the approach of night

D. the threat of an evening storm

26 In which line does the tone of the poem change dramatically?

A. line 3

B. line 6

C. line 9

D. line 11

English Language Arts

Language and Literature: Session 3

DIRECTIONS

This session contains two reading selections with thirteen multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Smoke and fire detectors alert people when a fire breaks out. However, not all smoke and fire detectors are the same. Read the following excerpt about smoke and fire detectors from a chapter in The Complete Guide to Home Repair and Maintenance*. Answer the questions that follow.*

SMOKE AND FIRE ALARMS

by Bernard Gladstone

1 Until a few years ago, the only type of fire detector that a homeowner could install was a heat sensor, a device containing a heat-sensitive strip of metal that melts when subjected to temperatures in excess of about 130 degrees (the actual melting point varies with the type of heat detector). The trouble with this type of fire detector is that by the time enough heat builds up to set it off, it can be too late for those in the house to escape—especially if occupants are asleep when the fire breaks out.

2 The development of early-warning smoke detectors some years ago resulted in a vastly improved margin of safety for homeowners and apartment dwellers, and these warning devices have now almost completely replaced heat detectors in most homes. They give warning of a fire by sounding an alarm before flames are even visible in most cases.

3 Heat detectors still have some practical value in areas where it is possible for a fire to flare up quickly and produce high heat with very little smoke at first—such as furnace rooms or kitchens, for example. But for whole-house protection of occupants at night, experts agree that smoke detectors are far better. In fact, many communities now require their installation in all apartment houses, as well as in all newly built houses. The Federal Housing Administration has long required the installation of smoke detectors in all homes that it finances.

. . .

4 Smoke detectors come in two basic types: ionization and photoelectric. In the ionization type there is a chamber containing an infinitesimal particle of radioactive material that electrically charges the air inside that chamber. When the airborne fumes or tiny particles that are the by-product of all combustion (and are too small to be seen by the eye) enter this chamber, they affect the flow of electrical current. The detector senses this change in current and sets off the alarm.

5 In a photoelectric-type smoke detector, the sensing chamber has a tiny light beam that shines across it and strikes a photosensitive cell on the other side. Smoke entering this chamber cuts down on the amount of light that reaches the cell—and again the effect is to sound the alarm.

6 Each type has advantages and disadvantages in responding to different types of fires, so most experts now agree that for maximum protection the homeowner should install both types in strategic locations. The ionization detector is quicker to sense a quick-spreading "clean" fire that gives off little or no smoke at first—for example, the kind of fire that is caused by burning paper, a

blazing Christmas tree, or flaming drapes. A photoelectric detector, on the other hand, will give quicker warning of a slow-burning, smoldering fire that gives off lots of smoke even though there is very little flame or even heat at the beginning—for example, the kind of fire that results from a cigarette smoldering in upholstered furniture or in a carpet.

7 It is a good idea to have one of each type outside the bedrooms or sleeping areas—you can never tell which type of fire will break out first. Adding a second detector is inexpensive insurance, because even a few seconds' delay can make the difference between getting away safely and becoming trapped behind a flaming barricade.

8 Another important factor to consider when selecting a smoke alarm for your home is the power source it will use. You can choose either a battery-powered model or one that is powered by plugging into a 110-volt household outlet—as well as a few that can be powered by both. The latter, while normally powered by house current, also contain a standby backup battery that takes over automatically in case of a power failure (the battery is usually the rechargeable type that, as long as it is plugged in, is kept continuously charged).

9 Battery-powered models are the simplest to install—you just screw them to the ceiling. Those powered by household current have a cord that must be plugged into a wall outlet, which means running wires down the wall to the nearest receptacle—unless a wall outlet is provided up near the ceiling, or unless the unit is permanently wired into a junction box near the ceiling.

10 The advantage of battery power is that the alarm will still work even if there is a power failure. Approved models have a built-in warning beeper that sounds automatically at regular intervals when the battery voltage is dropping below a safe operating capacity (the beep will continue at steadily increasing intervals for several days). You therefore know when it's time to put in a new battery. A word of caution: *Don't* take the battery out to stop the beeping until you actually have a new battery to put in.

11 Make sure you locate the detector close enough to the bedroom door to hear it even if you are sound asleep. All smoke detectors should be mounted on the ceiling—at least 6 to 8 inches away from the nearest wall, and out of natural drafts from open windows or doors. Use the test button to check the detector's operation at least once a week, and always test it immediately after returning home from a vacation or a long trip when the house has been left vacant for more than a few days.

27 Which of the following is **most likely** the purpose of the excerpt?

A. to persuade readers to check smoke detector batteries regularly

B. to describe the best power source for a smoke detector

C. to recommend the one best smoke detector to use

D. to explain how smoke detectors function

28 According to the excerpt, what is the **main** disadvantage of a fire detector that uses a heat sensor?

A. The metal strip does not always melt.

B. It takes too long to trigger the alarm.

C. It is difficult and expensive to install.

D. The detector does not have a battery backup.

29 According to the excerpt, what is the **main** advantage of an early-warning smoke detector compared to a heat detector?

A. It is the easiest to install.

B. It sounds an alarm before flames appear.

C. Its alarm will wake sleeping occupants.

D. It senses high heat immediately.

30 In the excerpt, what type of organization is used in paragraph 6?

A. definition

B. comparison and contrast

C. narration

D. cause and effect

31 Based on the excerpt, which fire would a photoelectric detector **most likely** detect the fastest?

A. a burning couch

B. burning curtains

C. burning newspapers

D. a burning wastepaper basket

32 In the excerpt, what is the **most likely** reason the author says that a homeowner should leave a low battery in the detector until a new battery can be installed?

A. The detector is still highly effective with a low battery.

B. The owner might forget to replace the battery.

C. Removing the battery could seriously damage the detector.

D. The detector could be beeping because there is a fire.

33 Which of the following **best** describes the meaning of *"clean" fire* in paragraph 6?

A. a fire that spreads slowly

B. a fire with little smoke

C. a fire with few flames

D. a fire with little heat

34 In paragraphs 7–11, what writing technique does the author use to instruct the reader?

A. He provides sensory details for the reader.

B. He uses short, direct sentences.

C. He addresses the reader directly.

D. He organizes the information chronologically.

Write your answer to open-response question 35 in the space provided in your Student Answer Booklet.

35 Describe what a person must do in order to correctly use and maintain a smoke detector. Use relevant and specific information from the excerpt to support your answer.

In this scene from I Ought to Be in Pictures*, you will find that there is a bit of tension between Herb and his daughter, Libby. Herb has had some hard times as a screenwriter, and he is discussing his daughter's future with her. But Libby has a mind of her own. Read this excerpt from Neil Simon's play and use the information to answer the questions that follow.*

I Ought to Be in Pictures

by Neil Simon

HERB (*Brightly*) So what are you doing? Just visiting here? A holiday or something? Please sit. Where are you staying?

LIBBY Last night I stayed at a motel. The Casa Valentino. You gotta use toilet paper for towels.

HERB Well, that's crazy. I got room in here. Why don't you stay with me while you're out here?

LIBBY I couldn't.

HERB And I don't want to hear any back talk.

LIBBY It's impossible. No.

HERB It's settled. All right?

LIBBY Sure. Thanks.

HERB How long are you going to be out here?

LIBBY The rest of my life.

HERB (*Looks at her. Smiles*) What do you mean?

LIBBY Well, it depends on how my career goes.

HERB What career is that?

LIBBY I want to be in pictures.

HERB You want to be in *what*?

LIBBY Pictures. Movies. I'm not ruling out television, but movies are my real goal.

HERB I see . . . Movies, heh. Well, you sure picked a tough business.

LIBBY So did you and you seem to be doing okay. (*She looks around, realizing what she has said*)

HERB What would you do?

LIBBY Act!

HERB Act? You want to be an *actress*? In the *movies*? That takes a little something called talent, you know.

LIBBY I've got talent. I've got plenty of talent. Some people think I'm kind of a female Dustin Hoffman.*

HERB What people?

LIBBY Robby and Grandma.

HERB Where have you ever acted?

LIBBY Places.

HERB What places?

LIBBY Erasmus High School. We did *The Prime of Miss Jean Brodie.*

HERB Really? What part did you play?

LIBBY I didn't have a part. I was the understudy.

---

* *Dustin Hoffman* — famous Hollywood actor

HERB For Jean Brodie?

LIBBY No. One of the girls in her class. Sandy.

HERB Sandy? I see . . . Did you ever get on?

LIBBY No. We only did two performances. And I had to work the lights.

HERB Oh. You were the lighting girl.

LIBBY *Assistant* lighting girl.

HERB I see. So you were the assistant lighting girl who was the understudy to Sandy, for two performances of *The Prime of Miss Jean Brodie* at Erasmus Hall High School.

LIBBY The summer session.

HERB The summer session. Well, it's not exactly what I would call a *wealth* of experience.

LIBBY No, it isn't. It's what you might call a "humble beginning." All I know is I believe in myself.

HERB That's terrific. That's very important. Unfortunately, in this business everybody *else* believes in themselves . . . What are you going to do when they ask you for a résumé?

LIBBY A what?

HERB A résumé. A list of your credits. What you've done. I don't think it's enough to give them a picture of you working the lights at Erasmus High School.

LIBBY I can read for them, can't I? I have this book of one-act plays that I read in my room every day. And I'm good too. I mean *really* good. Sometimes I even make myself cry. I *have* talent, I just need the outlet.

HERB And you picked the *movies* as your outlet?

LIBBY Yes. Because one thing I have is determination and confidence. Like, I have this tiny little flame burning deep inside of me, and I just need somebody to turn the gas jet up a little.

HERB And who did you figure would do that?

LIBBY I don't know. Someone out here. Someone in the business. Someone like a director — or a writer. Someone who's willing to give a young unknown kid from Brooklyn a chance.

HERB (*Nods*) Does he have to be from this particular neighborhood?

LIBBY I didn't say it was you.

HERB I was just asking.

LIBBY But if for any reason, you should want to make a phone call on my behalf, not out of any sense of loyalty or obligation or guilt, but just because you recognize some potential in me, I would appreciate it.

HERB Who taught you to talk like that?

LIBBY Like what?

HERB Like coming around corners, going up over the roof, down into the basement, and coming up through the sewer. You got something to say to me, say it straight out.

LIBBY Okay. Ordinarily I wouldn't be caught dead asking you for a favor, but it so happens that you owe me.

HERB I what?

LIBBY You owe me. You owe me for a lot. And Grandma said to me, "Go out to California and make sure that he pays you."

36 In the excerpt, what does the reader learn from Herb's conversation with Libby?

A. He does not care about Libby.

B. He has boasted about Libby to movie directors.

C. He knows very little about Libby.

D. He encourages Libby to set high goals.

37 What is the effect of the emphasis of the word *wealth* in line 43?

A. It reveals Herb's sarcasm.

B. It shows Herb's anger.

C. It stresses Herb's surprise.

D. It indicates Herb's generosity.

38 In line 51, Libby says, "Sometimes I even make myself cry." What does this suggest about her?

A. She is worried that she will never succeed as an actress.

B. She prefers to perform tragic plays.

C. She is an overly sensitive person.

D. She thinks her acting is very convincing.

Read lines 54–55 from the excerpt in the box below.

> . . . I have this tiny little flame burning deep inside of me, and I just need somebody to turn the gas jet up a little.

39 What does Libby hope will happen?

A. Herb will help her fulfill her dream.

B. She will receive her family's financial support.

C. Herb will send her to acting classes.

D. She will act in and direct a movie.

40 Which of the following is the **best** synonym for the word *humble* as it is used in line 44?

A. cheap

B. delayed

C. proud

D. simple

English Language Arts
Language and Literature Retest
November 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	11	*Reading and Literature*	8	D
2	11	*Reading and Literature*	15	B
3	11	*Reading and Literature*	8	C
4	11	*Reading and Literature*	8	D
5	12	*Reading and Literature*	8	A
6	12	*Language*	4	C
7	12	*Language*	5	B
8	13	*Reading and Literature*	15	
9	15	*Reading and Literature*	16	C
10	15	*Reading and Literature*	16	D
11	15	*Reading and Literature*	8	B
12	15	*Reading and Literature*	8	D
13	16	*Reading and Literature*	16	
14	19	*Reading and Literature*	8	B
15	19	*Reading and Literature*	8	B
16	19	*Reading and Literature*	15	B
17	19	*Reading and Literature*	12	C
18	20	*Reading and Literature*	12	D
19	20	*Reading and Literature*	12	D
20	20	*Reading and Literature*	12	A
21	20	*Language*	4	C
22	21	*Reading and Literature*	12	
23	23	*Reading and Literature*	14	A
24	23	*Reading and Literature*	14	A
25	23	*Reading and Literature*	14	C
26	23	*Reading and Literature*	15	D
27	26	*Reading and Literature*	13	D
28	26	*Reading and Literature*	8	B
29	26	*Reading and Literature*	8	B
30	26	*Reading and Literature*	13	B
31	27	*Reading and Literature*	13	A
32	27	*Reading and Literature*	13	B
33	27	*Language*	4	B
34	27	*Reading and Literature*	13	C
35	28	*Reading and Literature*	8	
36	31	*Reading and Literature*	17	C
37	31	*Reading and Literature*	15	A
38	31	*Reading and Literature*	17	D
39	31	*Reading and Literature*	17	A
40	31	*Language*	4	D

*Answers are provided here for multiple-choice items only.

III. Mathematics Retest

Mathematics Retest

The Mathematics Retest was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands, listed below.

- Number Sense and Operations
- Patterns, Relations, and Algebra
- Geometry
- Measurement
- Data Analysis, Statistics, and Probability

The grades 9–10 learning standards for these strands appear on pages 72–75 of the *Mathematics Curriculum Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/math/2000/final.pdf.

In *Test Item Analysis Reports,* Mathematics Retest results are reported under five MCAS reporting categories, which are identical to the five *Mathematics Curriculum Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Mathematics Retest included two separate test sessions, which were administered on consecutive days. Each session included multiple-choice and open-response questions. Session 1 also included short-answer questions.

Reference Materials and Tools

Each student taking the Mathematics Retest was provided with a *Grade 10 Mathematics Reference Sheet* and was allowed to refer to it at any time during testing. A copy of the reference sheet follows the final question in this chapter.

During session 2, each student had sole access to a calculator with at least four functions and a square root key. Calculator use was not allowed during session 1.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only during both Mathematics Retest sessions. No other reference tools or materials were allowed.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your reference sheet during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS

This session contains fourteen multiple-choice questions, four short-answer questions, and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 What is the value of the expression below?

$$7(1 - 3^2)$$

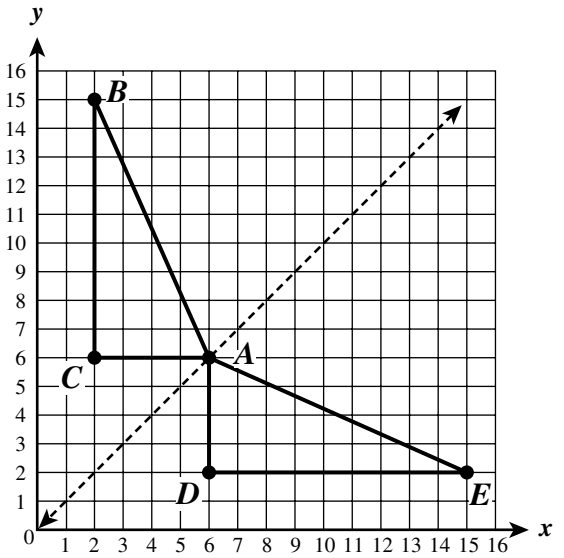
A. -56

B. -35

C. 28

D. 70

2 Right triangles *ABC* and *AED* are shown on the coordinate grid below.



Which single transformation, with respect to the line $y = x$, maps $\triangle ABC$ to $\triangle AED$?

A. dilation

B. reflection

C. rotation

D. translation

3 The distance along the walking trail behind Jessica's school is approximately 6,290 feet. Jessica calculated the mean length of her walking steps to be 2.9 feet.

Which of the following is closest to the number of steps Jessica would take to walk the entire trail?

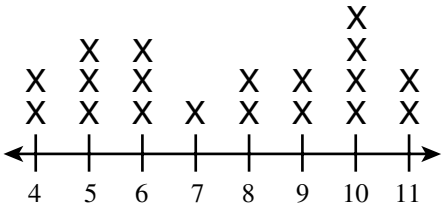
A. 200 steps

B. 1,800 steps

C. 2,000 steps

D. 18,000 steps

4 Sandra created the line plot shown below to display data on the shoe sizes of her classmates.



Shoe Sizes of Classmates

Based on the data given in the line plot, what is the median shoe size of Sandra's classmates?

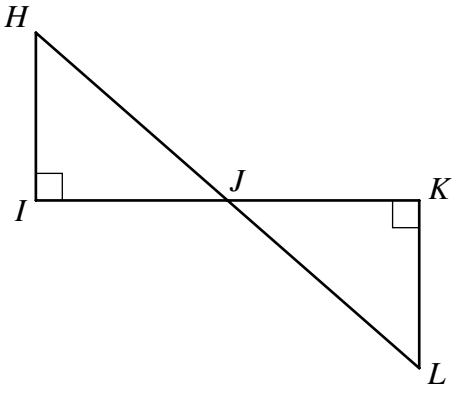
A. 7

B. 8

C. 10

D. 19

5 In the figure below, $\triangle HIJ \cong \triangle LKJ$.



If $m\angle L = 50°$, what is $m\angle IJH$?

A. 35°

B. 40°

C. 45°

D. 50°

6 Which of the following is equivalent to the expression below?

$$3^5 \cdot 3^3$$

A. 3^8

B. 3^{15}

C. 9^8

D. 9^{15}

7 Which of the following is closest to the value of the expression shown below?

$$\sqrt{65} - \sqrt[3]{65}$$

A. 2

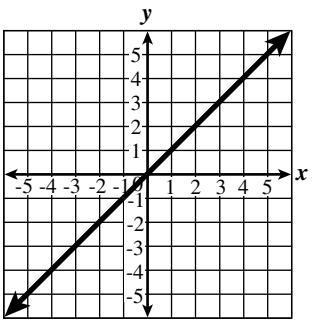
B. 3

C. 4

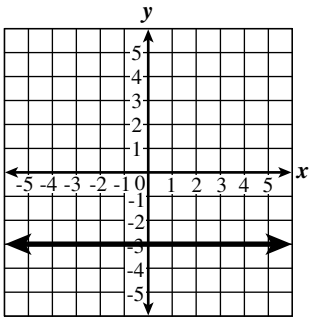
D. 5

8 Which of the following best represents the graph of a line with an undefined slope?

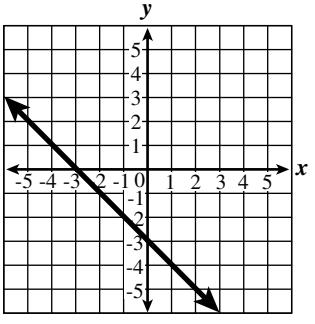
A.



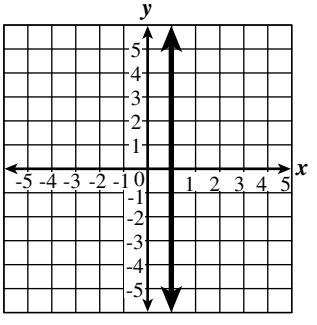
B.



C.



D.



9 The length of one edge of a cube is $(x + 3)$ units. Which of the following expressions represents the cube's total surface area in square units?

A. $x^2 + 9$

B. $6(x^2 + 9)$

C. $(x + 3)^2$

D. $6(x + 3)^2$

10 Which statement about $4\sqrt{79}$ is true?

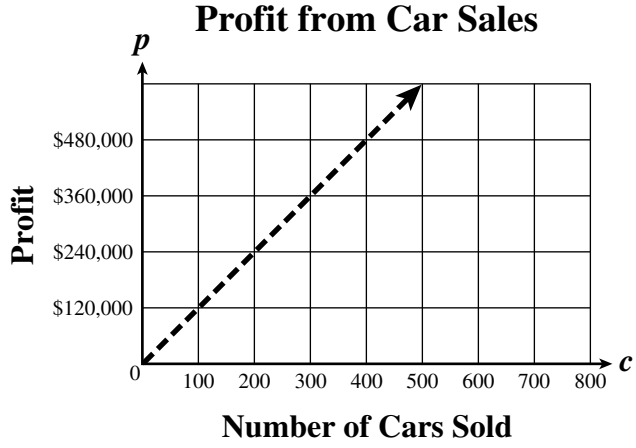
A. $4\sqrt{79} < 28$

B. $28 < 4\sqrt{79} < 32$

C. $32 < 4\sqrt{79} < 36$

D. $4\sqrt{79} > 36$

11 The graph below shows *p,* a company's profit, in terms of *c,* the number of cars it sells.



If *c* is a positive integer, which of the following equations best represents the company's profit?

A. $p = 1{,}200c + 120{,}000$

B. $p = 1{,}200c$

C. $p = 600c$

D. $p = 120{,}000c + 100$

12 Andrew used a wooden stick to estimate the length of a couch. Andrew, who is approximately 6 feet tall, measured his height to be about $1\frac{1}{2}$ sticks in length. He measured the couch to be about 2 sticks in length.

Based on Andrew's measurements, which of the following is closest to the length of the couch?

A. 8 feet

B. 9 feet

C. 12 feet

D. 18 feet

13 What value of n makes the following equation true?

$$\sqrt{n^2} = 10$$

A. 5

B. 10

C. 20

D. 100

14 What is the value of the expression below?

$$2(25 - 15)^2$$

A. 100

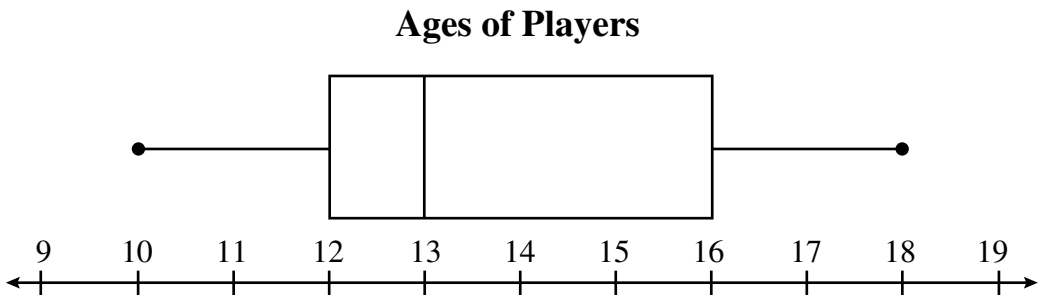
B. 200

C. 400

D. 800

Questions 15 and 16 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

15 The following box-and-whisker plot shows the ages of players on a neighborhood baseball team.



What is the range of the data set?

16 A landscape artist plans to create a garden on the front lawn of an art museum. The garden will be in the shape of a trapezoid. If the height of the trapezoid is 15 feet, and its bases measure 14 feet and 20 feet, what is the area, in square feet, of the trapezoid?

Question 17 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 17 in the space provided in your Student Answer Booklet.

17 Andy's Housecleaning Service charges a fixed fee of $40 per job, plus $15 per **half-hour** that a job requires.

a. If c represents Andy's total charges, write an equation that expresses c in terms of h, the number of half-hours that a job requires.

b. What is the total charge for Andy's services when a job requires $5\frac{1}{2}$ hours? Show all your work.

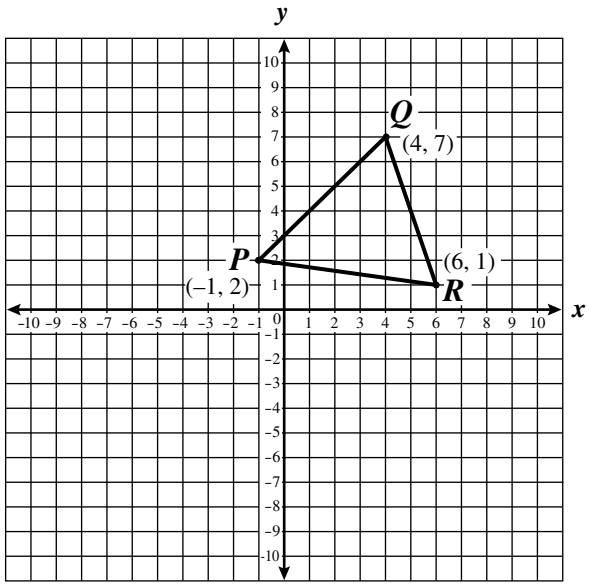
Hannah's Homemaids, another housecleaning service, charges no fixed fee but charges $25 per half-hour that a job requires.

c. If c represents Hannah's total charges, write an equation that expresses c in terms of h, the number of half-hours that a job requires.

d. The Jordans plan to have their house cleaned, and they like Andy's and Hannah's services equally well. For what number of half-hours would the charges for the two services be identical? Show or explain how you got your answer.

Questions 18 and 19 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

18 Triangle *PQR* is shown on the coordinate grid below.



Sydney accurately sketched $\triangle P'Q'R'$, the reflection of $\triangle PQR$ across the x-axis. What are the coordinates of point Q' in $\triangle P'Q'R'$?

19 The value of all of the quarters and dimes in a parking meter is $18. There are twice as many quarters as dimes. What is the total number of dimes in the parking meter?

Questions 20 and 21 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 20 in the space provided in your Student Answer Booklet.

20 Ms. Vargas is analyzing the scores her 10 chemistry students earned on their last test. To make her calculations easier, she reduced each score by 80 points and arrived at the simplified data set shown below.

{0, 4, 4, 5, 6, 7, 7, 7, 7, 9}

a. For the simplified data set, find each of the measures listed below. Show or explain how you got each answer.

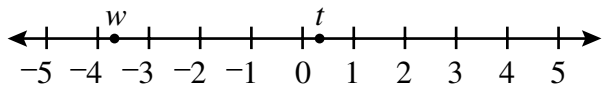
- mean
- median
- mode
- range

b. For the set of **actual** scores on the chemistry test, find each of the measures listed below. Show or explain how you got each answer.

- mean
- median
- mode
- range

Write your answer to question 21 in the space provided in your Student Answer Booklet.

21 Two real numbers have coordinates w and t as shown on the number line below. Copy the number line into your Student Answer Booklet.



a. What are the two real numbers represented by w and t on the number line?

b. The coordinate of Point A on the number line is $w + t$. Plot and label Point A on the number line and explain how you decided upon its location.

c. The coordinate of Point B on the number line is $w - t$. Plot and label Point B on the number line and explain how you decided upon its location.

d. The coordinate of Point C on the number line is $w \cdot t$. Plot and label Point C on the number line and explain how you decided upon its location.

Mathematics

SESSION 2

You may use your reference sheet during this session.
You may use a calculator during this session.

DIRECTIONS

This session contains eighteen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

22 During an experiment, a marine biologist recorded the length and mass of a sample of one type of fish. The measures for four of the fish in her sample are shown in the table below.

Length and Mass of Fish

Length (in centimeters)	Mass (in grams)
10	148
15	223
20	295
25	368

The marine biologist found that the relationship between the length and mass of this type of fish could best be represented by a linear model.

Based on the linear model for the data in the table, which of the following is closest to the mass of a fish with a length of 50 centimeters?

A. 75 grams

B. 438 grams

C. 739 grams

D. 1465 grams

23 In which equation below is $c = 0$ the **only** solution?

A. $c + 4 = 4 + c$

B. $c + 4 = 4$

C. $c + (-c) = 0$

D. $c + 4 = c$

24 The height of a triangle is 6 inches greater than the length of the base. If the area of the triangle is 20 square inches, what is the length of the base?

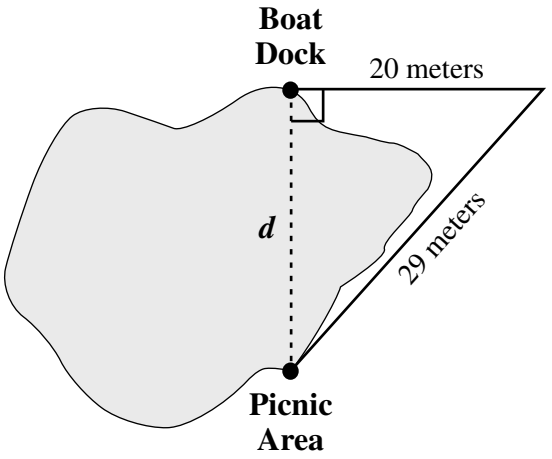
A. 4 in.

B. 6 in.

C. 12 in.

D. 14 in.

25 Malik used the measurements shown in the diagram below to find the distance across a pond between a boat dock and a picnic area.



What is *d*, the distance between these two points?

A. 18 meters

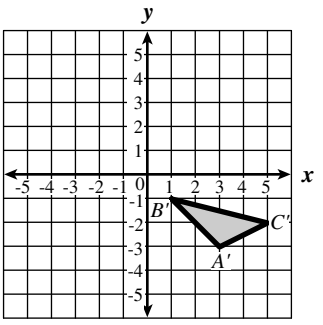
B. 21 meters

C. 25 meters

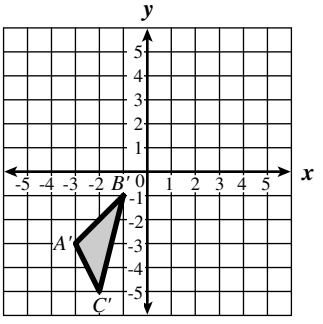
D. 49 meters

26 Triangle *ABC* has vertices at *A*(3, 3), *B*(1, 1), and *C*(2, 5). In which of the graphs below is triangle *A′B′C′* a reflection of triangle *ABC* over the *y*-axis?

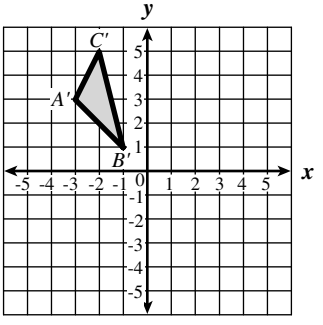
A.



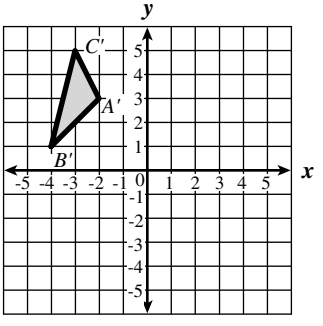
B.



C.



D.



27 A cube has a surface area of 96 square inches. What is the volume of the cube?

A. 16 cubic inches

B. 64 cubic inches

C. 96 cubic inches

D. 256 cubic inches

28 If $x \neq 0$, which of the following expressions is **not** equivalent to x^6?

A. $x^0 \cdot x^6$

B. $(x^3)^2$

C. $x^3 \cdot x^2$

D. $x^2 \cdot (x^2)^2$

29 Mr. Kentfield trains racehorses on a farm in Hampshire County. The horses train on a circular track with an inner circumference of 440 yards. Which of the following is closest to the area enclosed by the track?

A. 15,400 square yards

B. 30,800 square yards

C. 48,400 square yards

D. 61,600 square yards

30 A total of 120 adults and students attended a school volleyball game. Each adult paid \$2.50, and each student paid \$1.00. The total paid by the adults and students attending the game was \$189.

Which of the following systems of equations can be used to find a, the number of adults attending, and s, the number of students attending the game?

A. $\begin{cases} a+s=120 \\ 2.5a+2.5s=189 \end{cases}$

B. $\begin{cases} 2.5a+s=120 \\ a+s=189 \end{cases}$

C. $\begin{cases} 2.5a+s=120 \\ 3.5a+3.5s=189 \end{cases}$

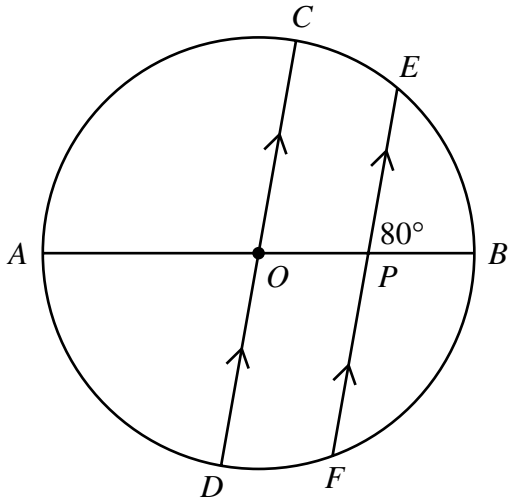
D. $\begin{cases} a+s=120 \\ 2.5a+s=189 \end{cases}$

Question 31 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 31 in the space provided in your Student Answer Booklet.

31 A circular garden with a diameter of 10 meters is crossed by 3 paths. The diagram below shows the garden and the paths. Paths $\overline{AB}$ and $\overline{CD}$ intersect at point O, the center of the garden. Path $\overline{EF}$ is parallel to path $\overline{CD}$, and $m\angle EPB = 80°$.



a. What is the circumference of the garden, to the nearest meter? Show or explain how you got your answer.

b. Four angles are formed where paths $\overline{AB}$ and $\overline{CD}$ intersect.

- What is the measure of $\angle AOD$?
- What is the measure of $\angle AOC$?

Label your answers and show or explain how you got them.

c. The grounds crew ran an electrical wire clockwise from point A to point C along the circumference of the garden. To the nearest meter, what is the length of the wire between the two points? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 32 through 40 in the spaces provided in your Student Answer Booklet.

32 Which of the following is equivalent to the expression below?

$$(x^2 - 3x + 1) - (4x - 2)$$

A. $x^2 - 7x - 1$

B. $x^2 - 7x + 3$

C. $-3x^2 - 3x + 3$

D. $x^2 + 12x + 2$

33 The perimeter of a rectangle is 48 inches. The length of the rectangle is 3 times the width of the rectangle. What is the area of the rectangle?

A. 24 square inches

B. 54 square inches

C. 108 square inches

D. 432 square inches

34 The number of minutes that Monah jumped rope each day last week is shown in the chart below.

Minutes Monah Jumped Rope Each Day

Day	Number of Minutes
Monday	8
Tuesday	12
Wednesday	7
Thursday	15
Friday	10

If Monah burns 12.5 calories per minute while she jumps rope, what was the mean number of calories per **day** that she burned by jumping rope in the 5 days?

A. 10

B. 52

C. 130

D. 625

35 A laboratory has a 75-gram sample of radioactive material. The half-life of the material is 10 days. (This means that it takes 10 days for half of the initial mass to decay.)

The formula below can be used to find m, the remaining mass in grams, in terms of t, the number of **10-day intervals** the mass has been decaying.

$$m = 75(0.5)^t$$

Based on the formula, what is the mass of the laboratory's sample remaining after 30 days?

A. 9.375 grams

B. 11.25 grams

C. 12.5 grams

D. 22.5 grams

36 Which of the following is equivalent to the expression below?

$$9x^2 - 16$$

A. $(3x - 4)^2$

B. $(9x - 4)(9x + 4)$

C. $(3x - 8)(3x + 8)$

D. $(3x - 4)(3x + 4)$

37 Gina played 16 games for her high school basketball team. The stem-and-leaf plot below shows the number of points she scored during each game.

Gina's Points

0	8 9 9
1	0 0 1 4 7 8 8
2	2 2 4 5 8
3	1

Key
2 | 4 represents 24

Based on the stem-and-leaf plot, in what percent of the games she played did Gina score more than 20 points?

A. 60%

B. 50%

C. $37\frac{1}{2}\%$

D. $31\frac{1}{4}\%$

38 Tyrone calculated the mean, median, mode, and range of the following data set.

{1, 2, 5, 5, 5, 8, 11, 13}

Then he realized that a data point of "2" was missing from the original data set. The corrected data set is shown below.

{1, 2, 2, 5, 5, 5, 8, 11, 13}

When Tyrone accurately recalculates the statistics, which measure will change?

A. mean

B. median

C. mode

D. range

39 The chart below shows the plans that Central High School seniors have made for the year after graduation.

Seniors' After-Graduation Plans

Attend 4-year college	56
Attend 2-year college	25
Attend technical college	9
Enter work force	6
Other/Undecided	4

Which of the following is the most appropriate way to display the information in this chart?

A. box-and-whisker plot

B. circle graph

C. scatterplot

D. stem-and-leaf plot

40 Which of the following is a true statement?

A. Doubling the radius of a sphere increases its surface area 4 times.

B. Doubling the radius of a sphere increases its volume 6 times.

C. Doubling the radius of a right circular cylinder while the height remains constant increases its surface area 4 times.

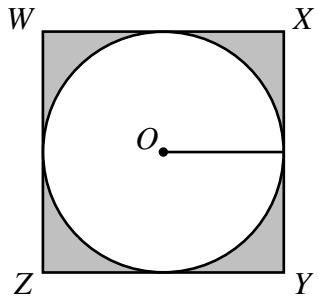
D. Doubling the radius of a right circular cylinder while the height remains constant increases its volume 8 times.

Questions 41 and 42 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 41 in the space provided in your Student Answer Booklet.

41 Circle *O* is inscribed in square *WXYZ*, as shown below. The shaded region represents the area inside square *WXYZ* but outside circle *O*.



Copy the table below into your Student Answer Booklet.

Length of Side of Square (in centimeters)	Area of Square (in cm^2)	Area of Inscribed Circle (in cm^2)	Area of Shaded Region (in cm^2)
2			
6			
10			

a. Complete your table by determining the values that belong in each row when the length of each side of the square is as follows:

- 2 centimeters
- 6 centimeters
- 10 centimeters

Show or explain how you got each of your nine answers. Be sure to write your answers in your table.

b. Suppose that the length of the side of the square is n centimeters. Using the pattern in the column titled "Area of Shaded Region" in the table, write an equation that expresses A, the area of the shaded region, in terms of n and π.

Write your answer to question 42 in the space provided in your Student Answer Booklet.

42 A company produces air-filled world globes in the shape of a sphere as shown in the figure below.

a. What is the volume of a globe with a radius of 10 centimeters? Show your work or explain how you got your answer.

b. The company makes a larger globe with a radius that is twice the radius of the globe described in part a. What is the ratio of the volume of the larger globe to the volume of the smaller globe in part a.? Show your work or explain how you got your answer.

c. The company also makes a mini-globe with a radius that is half the radius of the globe described in part a. What is the ratio of the volume of the mini-globe to the volume of the larger globe described in part b.? Show your work or explain how you got your answer.

d. Suppose that a fourth globe has a radius x times the radius of the globe described in part a. What is the ratio of the volume of the fourth globe to the volume of the globe in part a.? Show your work or explain how you got your answer.

Massachusetts Comprehensive Assessment System
Grade 10 Mathematics Reference Sheet

AREA FORMULAS

triangle ..... $A = \frac{1}{2}bh$

rectangle ..... $A = bh$

square ..... $A = s^2$

trapezoid ..... $A = \frac{1}{2}h(b_1 + b_2)$

CIRCLE FORMULAS

$C = 2\pi r$

$A = \pi r^2$

VOLUME FORMULAS

cube ..... $V = s^3$
(s = length of an edge)

rectangular prism ..... $V = lwh$

OR

$V = Bh$
(B = area of the base)

sphere ..... $V = \frac{4}{3}\pi r^3$

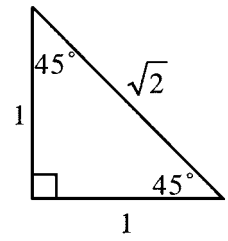
right circular cylinder ..... $V = \pi r^2 h$

right circular cone ..... $V = \frac{1}{3}\pi r^2 h$

right square pyramid ..... $V = \frac{1}{3}s^2 h$

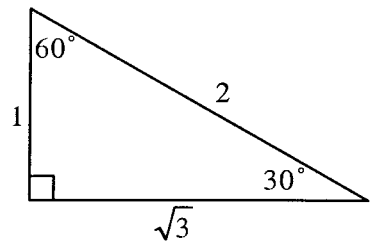
LATERAL SURFACE AREA FORMULAS

rectangular prism ..... $LA = 2(hw) + 2(lh)$
right circular cylinder ..... $LA = 2\pi rh$
right circular cone ..... $LA = \pi r\ell$
right square pyramid ..... $LA = 2s\ell$
(ℓ = slant height)



TOTAL SURFACE AREA FORMULAS

cube ..... $SA = 6s^2$
rectangular prism ..... $SA = 2(lw) + 2(hw) + 2(lh)$
sphere ..... $SA = 4\pi r^2$
right circular cylinder ..... $SA = 2\pi r^2 + 2\pi rh$
right circular cone ..... $SA = \pi r^2 + \pi r\ell$
right square pyramid ..... $SA = s^2 + 2s\ell$
(ℓ = slant height)



Mathematics Retest
November 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	36	*Number Sense and Operations*	10.N.2	A
2	36	*Geometry*	10.G.9	B
3	37	*Number Sense and Operations*	10.N.4	C
4	37	*Data Analysis, Statistics, and Probability*	10.D.1	B
5	37	*Geometry*	10.G.4	B
6	37	*Number Sense and Operations*	10.N.2	A
7	38	*Number Sense and Operations*	10.N.3	C
8	38	*Patterns, Relations, and Algebra*	10.P.2	D
9	39	*Measurement*	10.M.2	D
10	39	*Number Sense and Operations*	10.N.3	C
11	39	*Patterns, Relations, and Algebra*	10.P.2	B
12	39	*Measurement*	8.M.4	A
13	40	*Number Sense and Operations*	10.N.1	B
14	40	*Number Sense and Operations*	10.N.2	B
15	41	*Data Analysis, Statistics, and Probability*	10.D.1	8
16	41	*Measurement*	10.M.1	255 square feet
17	42	*Patterns, Relations, and Algebra*	10.P.8	
18	43	*Geometry*	10.G.9	(4, -7)
19	43	*Patterns, Relations, and Algebra*	10.P.8	30
20	44	*Data Analysis, Statistics, and Probability*	10.D.1	
21	45	*Number Sense and Operations*	10.N.4	
22	46	*Patterns, Relations, and Algebra*	10.P.1	C
23	46	*Number Sense and Operations*	10.N.1	B
24	46	*Patterns, Relations, and Algebra*	10.P.7	A
25	47	*Geometry*	10.G.5	B
26	47	*Geometry*	10.G.9	C
27	48	*Measurement*	10.M.2	B
28	48	*Patterns, Relations, and Algebra*	10.P.4	C
29	48	*Measurement*	10.M.1	A
30	49	*Patterns, Relations, and Algebra*	10.P.8	D
31	50	*Geometry*	10.G.3	
32	51	*Patterns, Relations, and Algebra*	10.P.3	B
33	51	*Measurement*	10.M.1	C
34	51	*Data Analysis, Statistics, and Probability*	10.D.1	C
35	52	*Patterns, Relations, and Algebra*	10.P.7	A
36	52	*Patterns, Relations, and Algebra*	10.P.4	D
37	53	*Data Analysis, Statistics, and Probability*	10.D.1	C
38	53	*Data Analysis, Statistics, and Probability*	10.D.1	A
39	54	*Data Analysis, Statistics, and Probability*	10.D.1	B
40	54	*Measurement*	10.M.3	A
41	55	*Patterns, Relations, and Algebra*	10.P.1	
42	56	*Measurement*	10.M.3	

*Answers are provided here for multiple-choice and short-answer items only. Each open-response item has its own set of scoring guidelines, which allow for valid alternate interpretations and responses.